

CLAIMS

1. Method for controlling automatic or automated transmission downshift used for power braking and comprising a group of standard downshift laws, characterized in that it consists in defining, below a certain arbitrary threshold ($E_{\text{threshold}}$) of depression of the acceleration pedal, a new downshift law intended to replace the standard downshift law in activity and defined by a gap ($\Delta_{(n)(n-1)}$) of the gear shifting law in activity, this gap ($\Delta_{(n)(n-1)}$) being calculated between the arbitrary threshold ($E_{\text{threshold}}$) of depression of the acceleration pedal and the depression zero of the acceleration pedal.

2. Method for controlling according to claim 1, characterized in that the calculation of the gap ($\Delta_{(n)(n-1)}$) of the gear shifting law in activity comprises the following steps:

- a) determining by fuzzy logic, for an engaged transmission ratio, for a depression (E) of the acceleration pedal equal to zero and from the deceleration of the vehicle due to braking (Γ_{veh}), the duration of braking (T_{braking}), the speed of the vehicle (V_{veh}) and the load of the vehicle (Q), an interval (I) of speeds of the input shaft of the gearbox of the engine in which downshifting must be triggered, this interval (I) comprising an upper limit (Ω_{Sport}) which corresponds to a sportive driving style and a lower limit (Ω_{Eco}) which corresponds to an economical driving style,
- b) determining by linear extrapolation as a function of a sportivity index ($I_{\text{sportivity}}$) of the driving style of the driver, itself determined by fuzzy logic, and as a function of the speeds (Ω_{Eco}) and (Ω_{Sport}) calculated previously, the speed

($\Omega_{\text{threshold}}$) of the input shaft of the gearbox of the engine below which downshifting must be triggered,

- c) converting the speed ($\Omega_{\text{threshold}}$) of the input shaft of the gearbox at a speed of the vehicle at the wheel ($V_{\text{veh}(n)(n-1)}$) for each gear (N), this speed ($V_{\text{veh}(n)(n-1)}$) corresponding to the position where the depression (E) of the acceleration pedal is zero,
- d) calculating by linear interpolation the gap ($\Delta_{(n)(n-1)}$) between the position where the depression (E) of the acceleration pedal is zero and the position where the depression (E) of the acceleration pedal is equal to the arbitrary threshold ($E_{\text{threshold}}$) of the depression of the acceleration pedal,
- e) verifying that the gap ($\Delta_{(n)(n-1)}$) is above or equal to zero, otherwise keeping the result obtained with the standard downshift law.

3. Automatic or automated transmission of a motor vehicle, characterized in that it comprises a method for controlling automatic or automated transmission downshift used for power braking according to any one of the preceding claims.